

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
GRASSED WATERWAY
NEW YORK
(Acre)
CODE NY412

DEFINITION

A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation.

PURPOSE

To convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all sites where:

- added capacity, vegetative protection, or both are required to control erosion resulting from concentrated runoff, and
- where drainage area and site conditions will allow successful installation.

DESIGN CRITERIA

Capacity: The minimum capacity shall be that required to convey the peak runoff expected from a storm of 10-year frequency, 24-hour duration. When slope is less than 1 percent, out-of-bank flow may be permitted if such flow will not cause excessive erosion. The minimum in such cases shall be the capacity required to remove the water before crops are damaged.

Velocity: Design velocities shall not exceed those given in:

- Table 1 of this standard,
- the procedures in Chapter 7, NRCS Engineering Field Handbook, or
- ARS Agricultural Handbook 667, "Stability Design of Grass-Lined Open Channels".

TABLE 1

<u>Velocity (v) in ft./sec.</u>			
	Channel Vegetation		
Soil Texture	Poor	Fair	Good
Sand, silt, sandy loam and silty loam	1.5	2.0	3.0
Silty clay loam and sandy clay loam	2.5	3.0	4.0
Clay, fine gravel, graded loam to cobbles	3.0	4.0	5.0
Fragipan	5.0	6.0	7.0
Shale	7.0	--	--

Velocity - Stone Center: When the vegetation is supplemented by stone lining, the velocity may be increased by one-third of Table 1 but not to exceed 9 ft./sec. The stone size required will be determined by using guidance in Chapter 7, NRCS Engineering Field Handbook. When velocities are greater than specified, design should be in accordance with NRCS Conservation Practice Standard 468; Lined Waterway or Outlet.

Width: The bottom width of trapezoidal waterways shall not exceed 100 ft. unless multiple or divided waterways or other means are provided to control meandering of low flows.

Side Slopes: Side slopes shall not be steeper than a ratio of two horizontal to one vertical. They should be designed to accommodate the land user's equipment.

Depth: The minimum depth of a waterway that receives water from terraces, diversions, or other tributary channels shall be that required to keep the design water surface elevation at, or below, the design water surface elevation in the terrace, diversion, or other tributary channel at their junction when both are flowing at design depth.

Drainage: NRCS Conservation Practice Standards 606, Subsurface Drains or 620, Underground Outlets (620), stone center waterways, or other suitable measures shall be

provided for in the design for sites having prolonged flows, a high water table, or seepage problems. Water-tolerant vegetation such as reed canarygrass may be an alternative on some wet sites.

Outlets: All grassed waterways shall have a stable outlet with adequate capacity to prevent ponding or flooding damages. The outlet can be another vegetated channel, an earth ditch, a grade stabilization structure, or other suitable outlets.

Establishment of Vegetation: Grassed waterways will be vegetated according to NRCS Conservation Practice Standard 342, Critical Area Planting. The vegetation should be well established before large flows are permitted in the channel. Special protection such as flow diversion, mulch anchoring, straw or hay bale dikes, or other diversion methods are warranted during the establishment period

Erosion and Sediment Control: An erosion and sediment control plan shall be developed for all disturbed areas. For disturbed areas greater than one acre, the erosion and sediment control plan shall meet the planning, installation, and maintenance requirements of NYS Pollutant Discharge Elimination System General Permit for Storm water Discharges. All Erosion and sediment structures and measures shall be installed prior to earth disturbing activities unless otherwise directed in the construction drawings.

PLANNING CONSIDERATIONS

The most critical time in successfully installing grassed waterways is when vegetation is being established. Supplemental irrigation may be warranted.

The waterway shall be located to minimize farm trafficability problems from planting, tillage, manure spreading, spraying, etc.

The downstream effects of changed volumes and rates of runoff should be considered.

Consider the potential effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substance carried by runoff to outlet and/or surface inlets.

Geosynthetic channel liners designed to reinforce the root system may be used.

To enhance the filtering effects of vegetation on movement of sediment and dissolved and sediment-attached substances, consider the use of trapezoidal shaped waterways where low flows are controlled.

There may be some short-term and construction-related effects on downstream water resources.

PLANS AND SPECIFICATIONS

Plans and specifications for grassed waterways shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

A maintenance program shall be established to maintain waterway capacity, vegetative cover, and the outlet. Damage by livestock, machinery, herbicides, or erosion must be repaired promptly.

Erosion and sediment control structures will be maintained periodically and after every major runoff event until the disturbed area is fully protected.

REFERENCES

Referenced Conservation Practice Standards can be found in the **National Handbook of Conservation Practices**, Section IV, Field Office Technical Guide, USDA-NRCS, Syracuse, NY.

A Guide to Conservation Plantings on Critical Areas for New York. Gaffney, F.B., et. al., USDA- Soil Conservation Service, Syracuse, New York, 1991

Grassed Waterways, Chapter 7, **Engineering Field Handbook**, USDA-NRCS, Washington, DC

Stability Design of Grass-Lined Open Channels, Agricultural Handbook 667, Agricultural Research Service, Washington, DC, September 1987.

New York Standards and Specifications for Erosion and Sediment Control (blue book)